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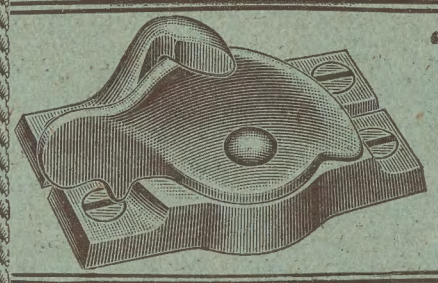

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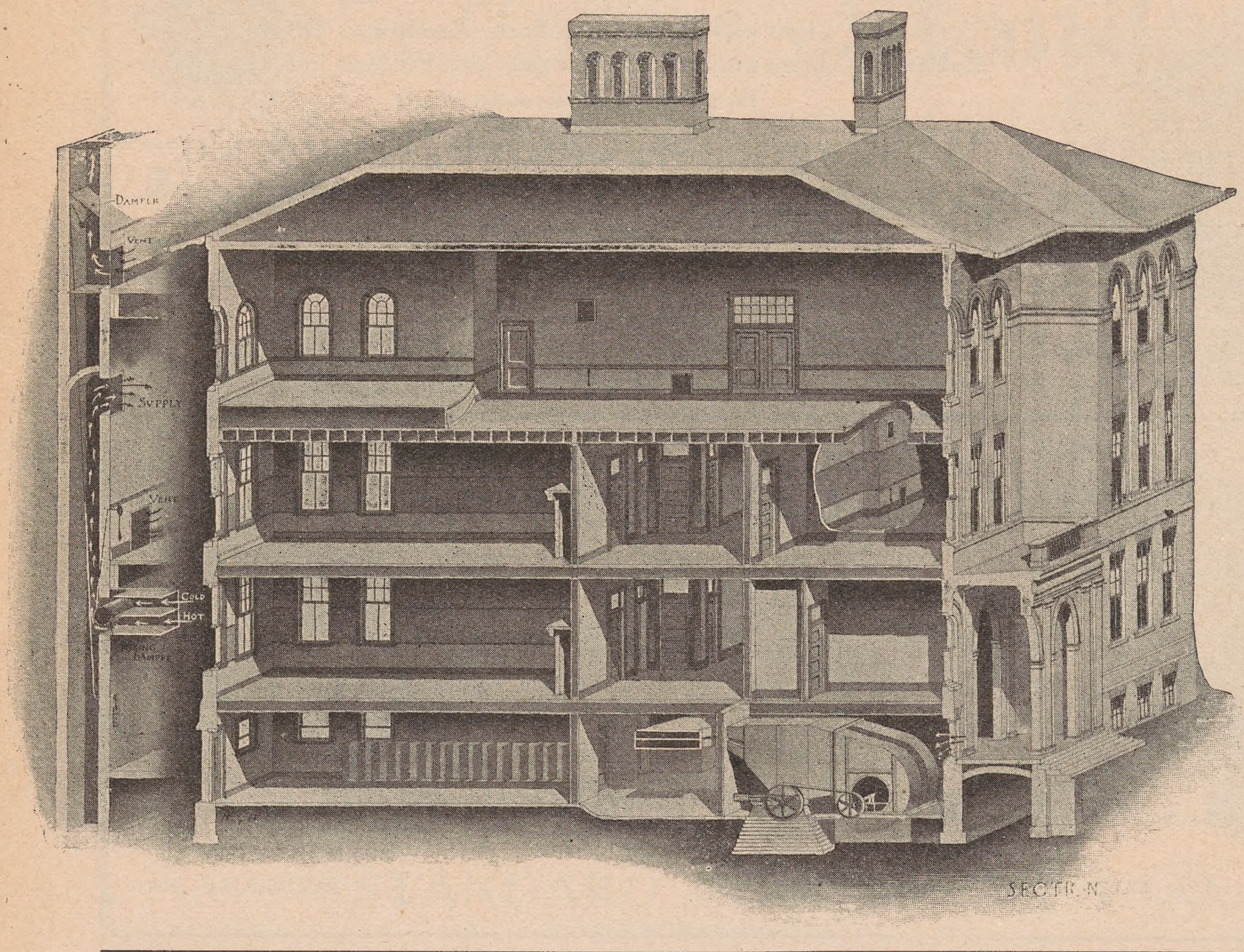

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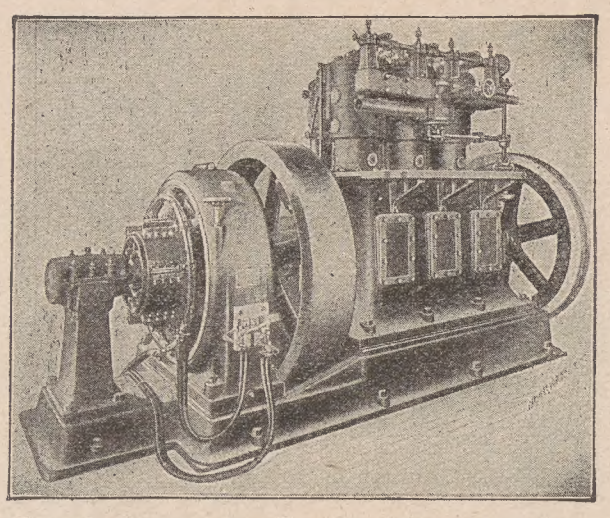

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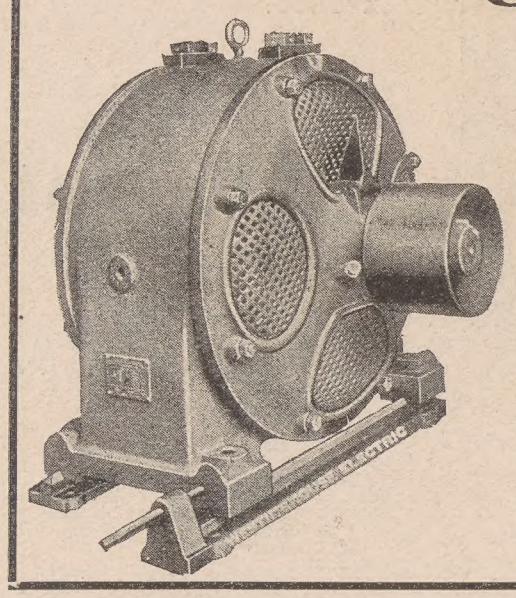

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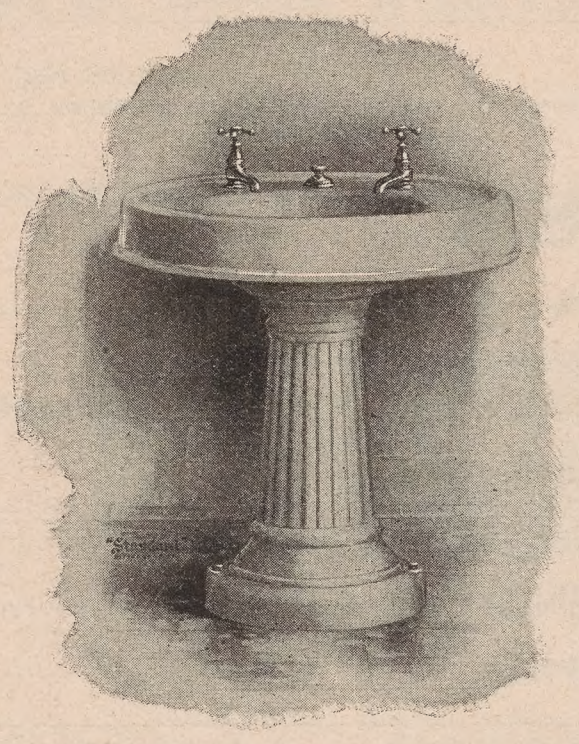

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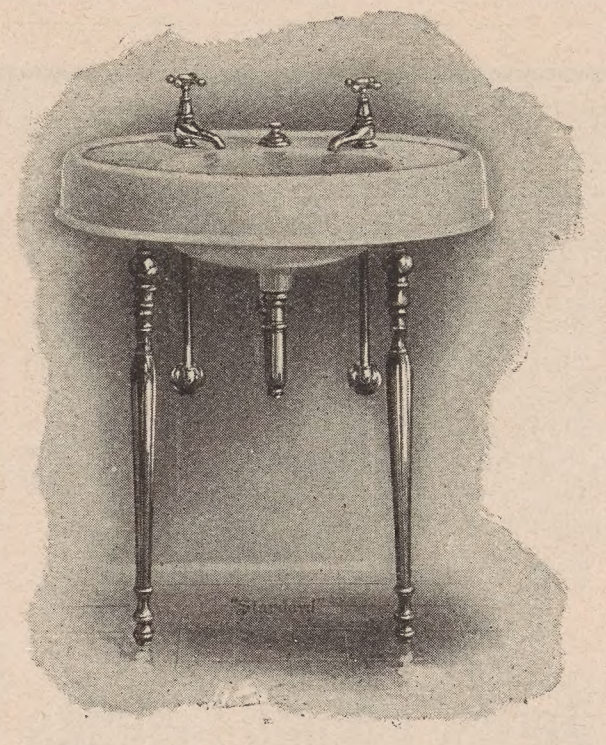

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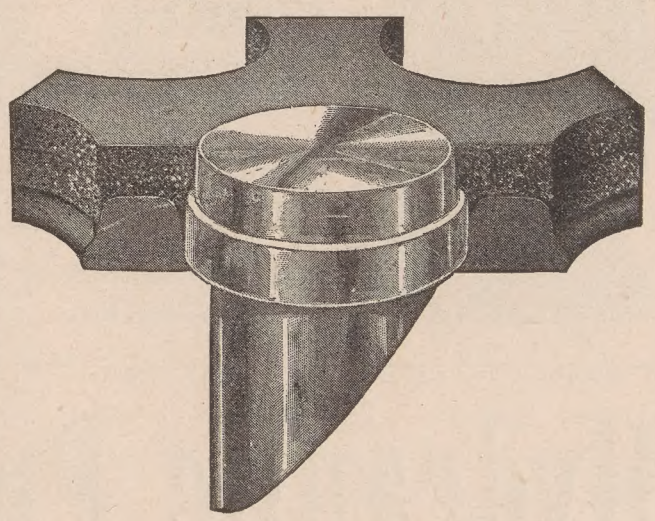

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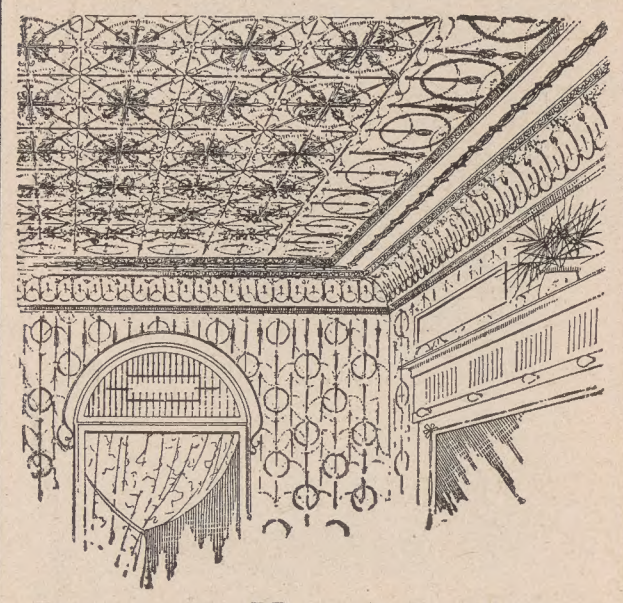

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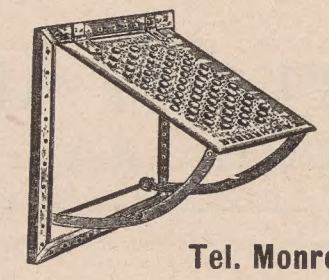

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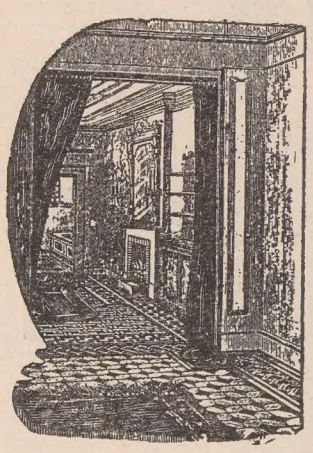

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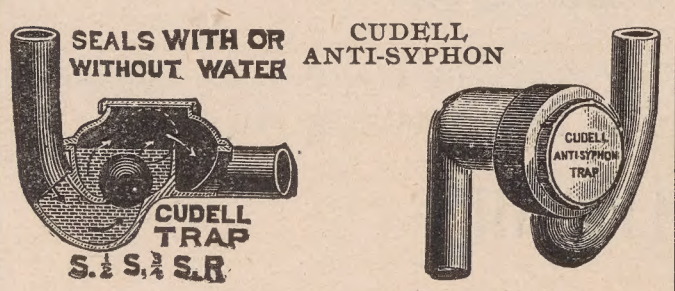

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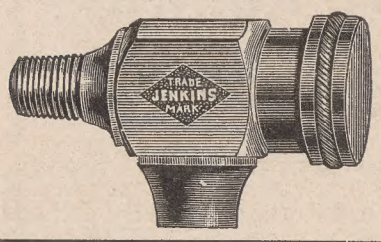

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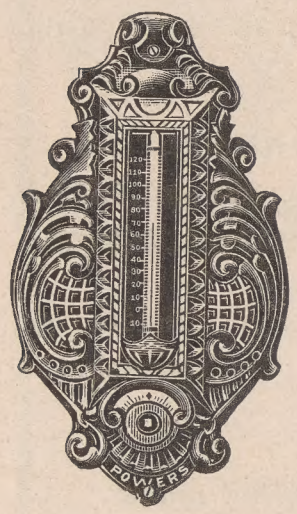

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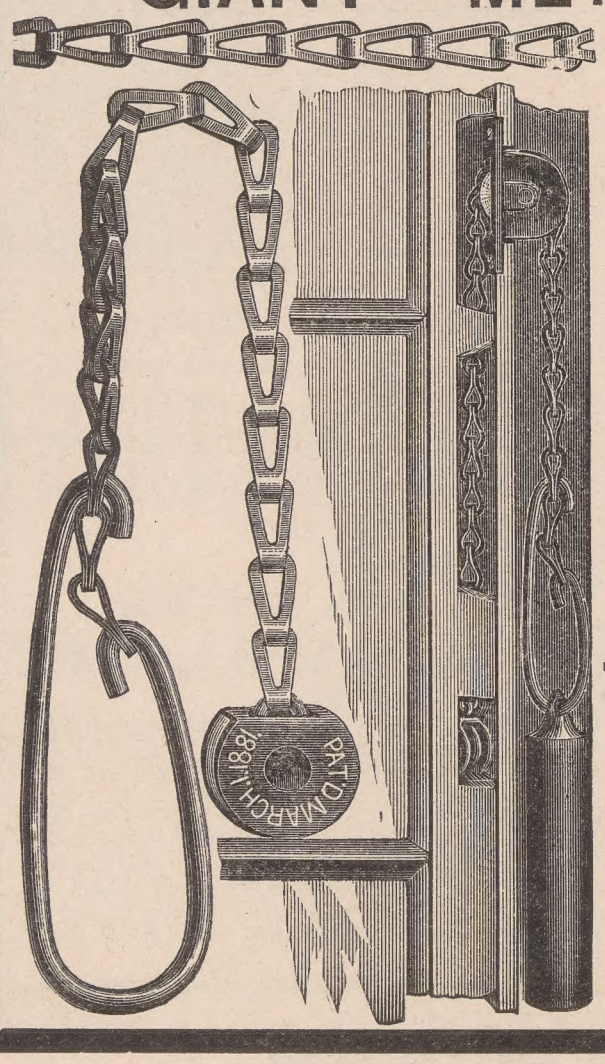

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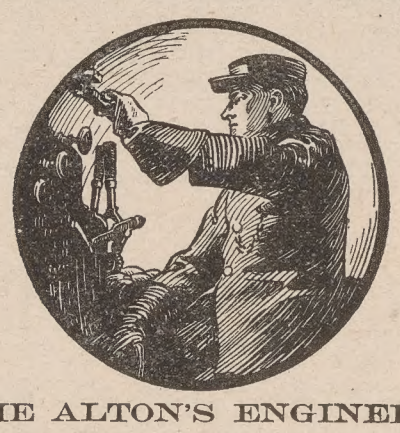

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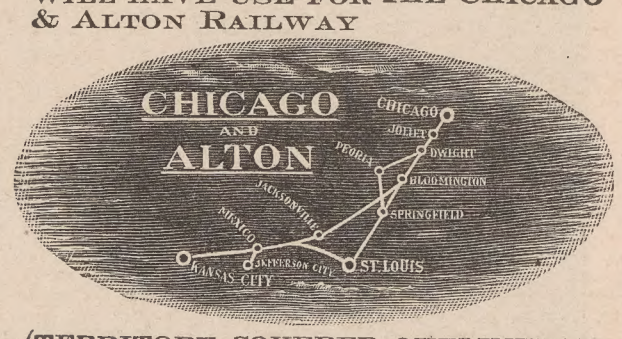

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Smith, Edward, & Co	XVI
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Joseph Dixon Crucible Co	VI
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Crane Co	VI, XIV
Standard Sanitary Mfg. Co.	V
Printers.	
The H. O. Shepard Co	VII
Railroads.	
Big Four Route	XV
Chicago & Alton	VII, X
Chicago & North-Western R'y	X
Chicago, Milwaukee & St. Paul	IX
Delaware, Lackawanna & Western	XIV
Denver & Rio Grande R. R.	XV
Grand Trunk Lines	IX
Illinois Central	XIV
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Monon and C. H. & D. Route	XI
Missouri Pacific R'y	VIII
New York Central R. R.	IV
Queen & Crescent Route	VII
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Southern R'y	X
Southern Pacific Co	X
Santa Fe Route	X
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Van Noorden Co	V
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Folsom Snow Guard Co	X
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Louis J. Millet	V
Steam Engines.	
Westinghouse, Church, Kerr & Co	IV
The Westinghouse Machine Co	IV
Steam Fittings.	
Crane Co	XV
Steam Loops.	
Westinghouse, Church, Kerr & Co	IV
The Westinghouse Machine Co	IV
Steel Rolling Doors.	
Kinnear Mfg. Co	VIII
Steel Rolling Shutters.	
Kinnear Mfg. Co	VIII
Steel Shutters.	
American Sidewalk Light Co.	IX
Kinnear Mfg. Co	X
Stokers.	
Westinghouse, Church, Kerr & Co	IV
The Westinghouse Machine Co	IV
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The Powers Regulator Co	VIII
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Northwestern Terra-Cotta Works	II
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New York Belting & Packing Co., Ltd	VII
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Peterson, P. S., & Son	X
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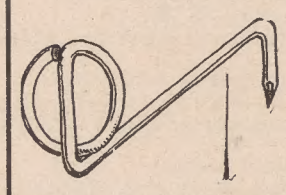

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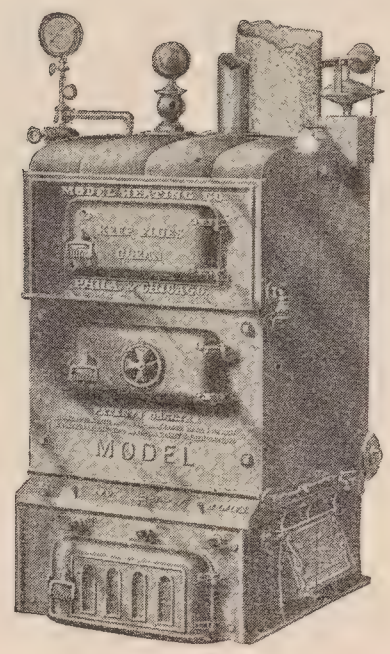

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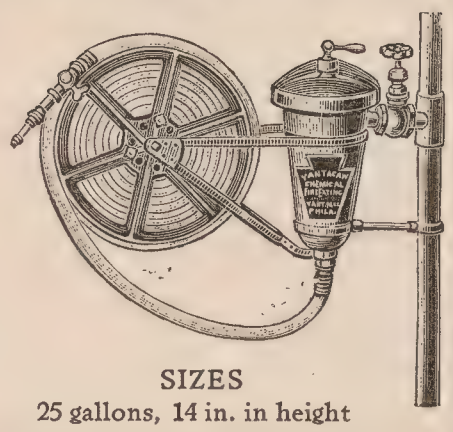

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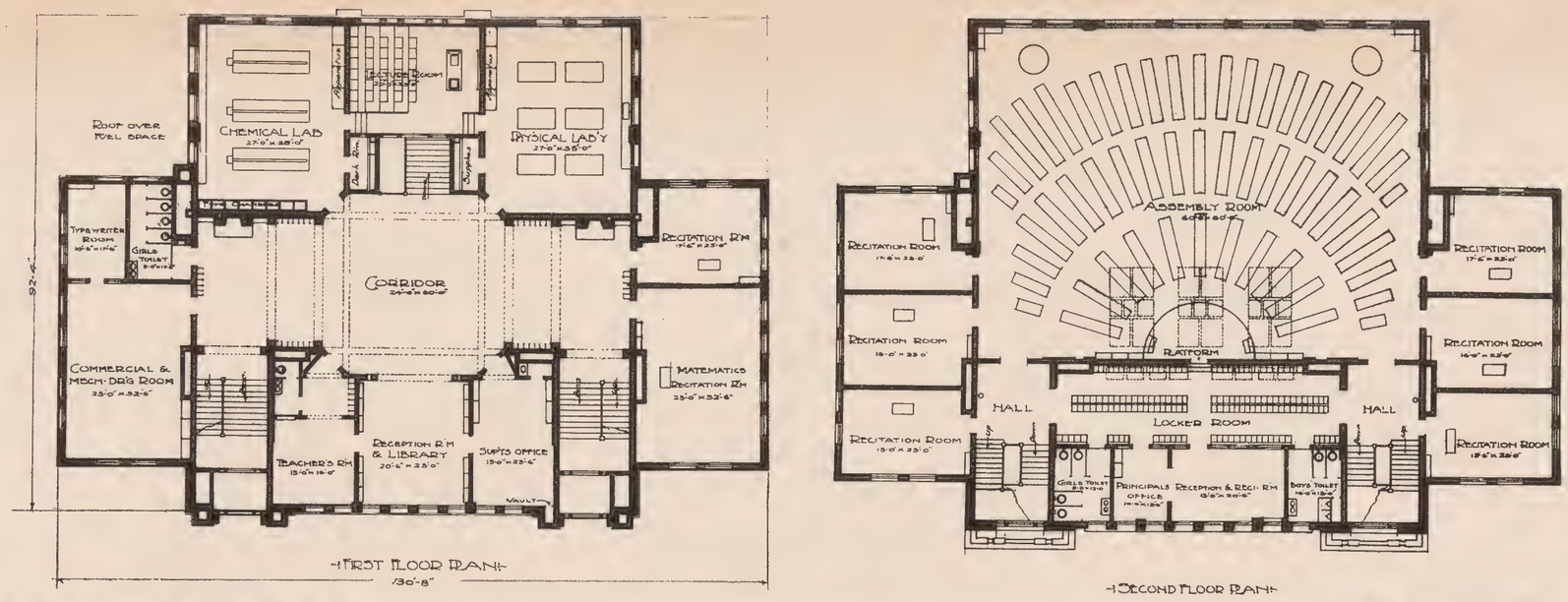
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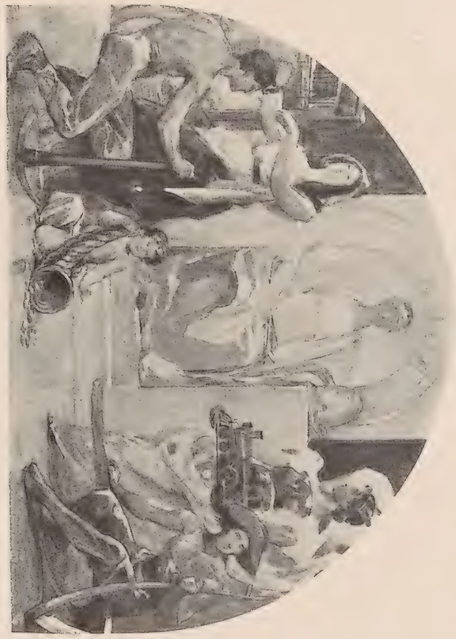

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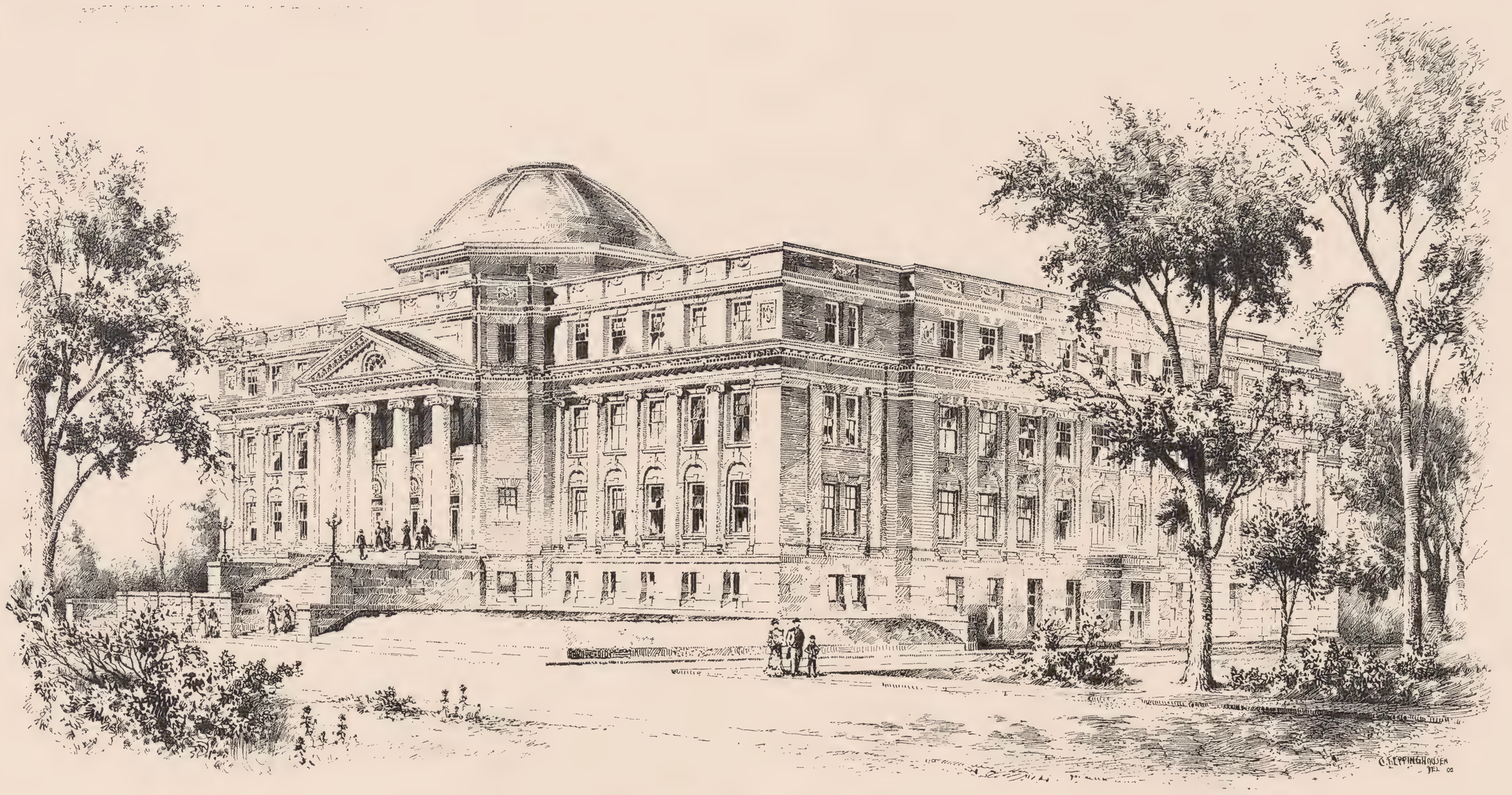

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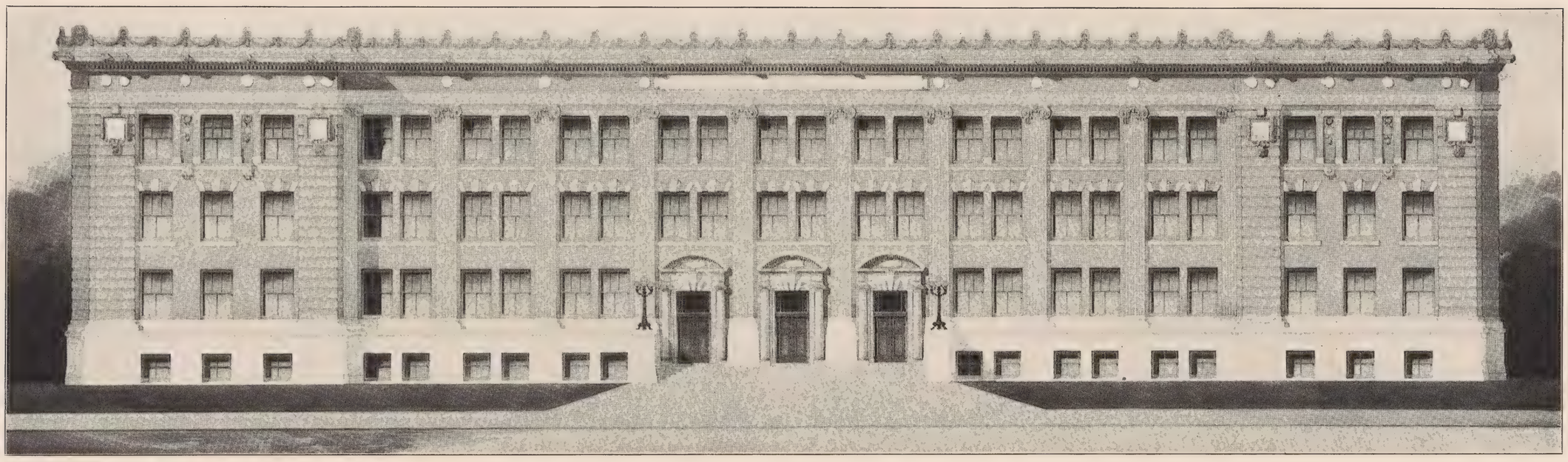

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THE INLAND ARCHITECT AND NEWS RECORD

Vol. XLI. MARCH, 1903. No. 2

THE INLAND ARCHITECT AND NEWS RECORD

A Monthly Journal Devoted to

ARCHITECTURE,

CONSTRUCTION, DECORATION AND FURNISHING

IN THE WEST.

PUBLISHED BY THE INLAND PUBLISHING CO.,
609-610 MANHATTAN BUILDING, CHICAGO, ILL.

L. MULLER, Jr., Manager. ROBERT CRAIK McLEAN, Editor.

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Death of Richard M. Upjohn, Architect.

Richard Michael Upjohn died at his home in Brooklyn on March 4, at the age of about seventy-eight years. While Mr. Upjohn's reputation as an architect will probably rest upon the designing of the State capitol of Connecticut, at Hartford, as his father, Richard Upjohn, is remembered as the architect of Trinity Church, New York, he was the architect of several noted structures, among them being St. Paul's Church at Brooklyn, the Central Congregational Church at Boston, St. Peter's Church at Albany and the Episcopal Church and High School at Hartford. Somewhat peculiar in his attitude toward men in general, he was cordial and appreciated by his friends, and gave to his profession every aid that would make for advancement and standing. His father was one of the charter members of the American Institute of Architects. Mr. Upjohn was a member throughout his professional life. His life and works give him a place among those names that head the roll of America's great architects. His office was the schoolroom from which many architects graduated into a professional life to which they have, in several cases, given more than usual evidence of their early training in securing, through their works, exceptional professional honor; among these being Mr. Clinton, of Clinton & Russell, and Cyrus L. W. Eidlitz, of New York, and Solon S. Beman, of Chicago.

A New Lien Law for Illinois.

While lien laws and measles have always seemed necessary to the people and accepted as unavoidable evils, while in the latter the treatment seems to remain the same, in the matter of lien laws the practice has been to tinker with them every time a snag is struck in their operation of sufficient force to jar some member of a building society into action, and, like the measles, the jar is contagious, and the result is an epidemic of ideas that does not subside until a new bill is formulated and presented to a State Legislature for passage. Here and there is found an individual who is immune and these ask why a building contractor or a material concern should be protected by a lien any more than a banker or grocer. But these skeptical individuals are in a hopeless minority and so the lien-law tinkering goes on. At present there is a bill before the Illinois State Legislature for the modification of the present law. The bill is a good one. An improvement upon that in operation, which, when formulated and passed ten years ago, was supposed to be the best of its kind. If we must have lien laws this present measure is probably as equitable and comprehensive as can be drawn.

An Architect's Objections to High Buildings.

Now that the "skyscraper" has seemingly come to stay, their disadvantages are becoming apparent. George B. Post in an address recently said that high buildings are structurally safe until something happens to the steel beams, that they are a menace to health, and their construction on narrow streets will necessitate "two-decker" streets to accommodate the occupants. One danger is the liability of suffocation by smoke in hallways and elevator shafts, in case of fire in the basement, to tenants who do not remain in their offices with doors closed.

HEATING.

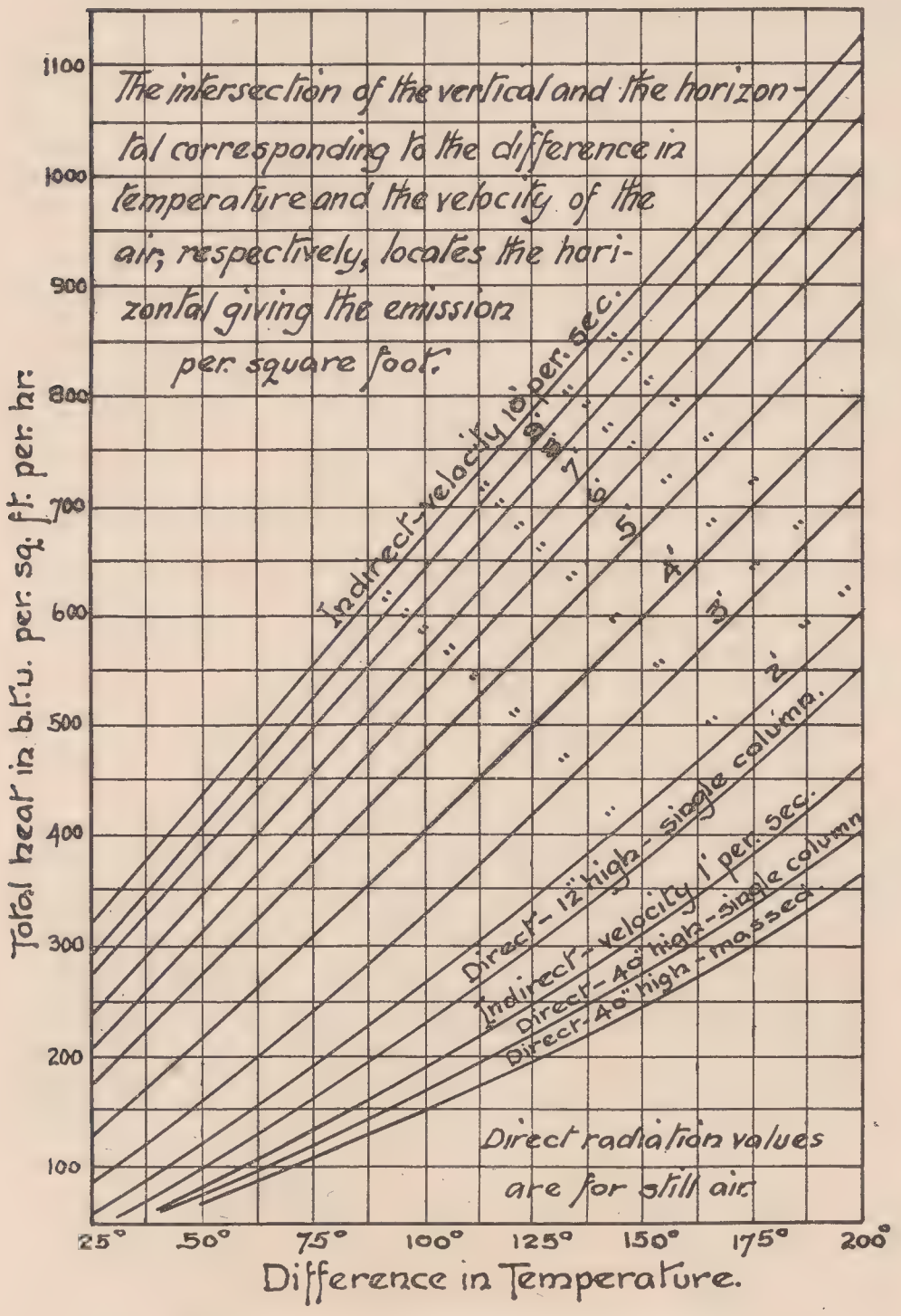
BY C. E. THOMAS, ARCHITECT.

(Continued from page 3, Vol. XLI, No. 1.)

DIRECT INDIRECT.

Direct-indirect radiation is used where a limited amount of air is to be supplied for ventilation. Its chief value lies in its being so arranged that the indirect portion may be operated as direct, for as a ventilating apparatus it is not only unreliable but expensive.

As the outside air is brought in contact with the radiator, it becomes necessary to increase the amount of radiation, but on



account of its dual nature, it may be considered amply safe to add twenty-five per cent to that required for direct radiation.

Having obtained the equivalent glass area, the amount of radiation may be readily taken from Diagram No. 1; thus in Example No. 1 the equivalent glass area = 160, hence 50 square feet of direct-indirect radiation would be required for steam and 80 square feet for hot water.

INDIRECT.

It has long been accepted that the best method of heating and ventilating a schoolroom is by bringing the warm, fresh air in near the ceiling and taking out the foul air near the floor. The reasons for this arrangement are simple:

1. As the warm air will go to the ceiling in any event, it is best to keep it well above the occupants of the room.

2. The warm air cools and settles very gradually, providing the best possible diffusion of gases.

3. The warm air near the ceiling is practically pure, for it has just been brought in; conversely, the foul air must be diffused in the lower part of the room and by placing the vent opening near the floor the removal of not only the vitiated air but the cold air is accomplished, and thus the temperature of the room is maintained economically, and a continuous, though imperceptible, current throughout the room is created. Another advantage in this location of openings and one that is often overlooked, is that the stacks are made as long as possible, and this is a most important factor in the movement of air by gravity.

It is difficult to understand why men who are thoroughly familiar with these facts will insist on trying to heat residences with the system inverted, or with just half a system.

To make a success of heating a room with hot air, some means must be provided for the ready escape of the air, no matter what kind of system is used, direct-indirect, indirect, fan or furnace.

The following data are based on complete systems.

Under ordinary conditions, if the amount of air to be provided for ventilation exceeds five changes per hour for small rooms, such as living-rooms in residences, and four changes per hour for large rooms, such as schoolrooms, the cooling surfaces may be disregarded and the calculations made on the air required, as this will take care of the losses through walls, etc.

If the ventilation is not important, the first step in the calculations is to find the amount of air necessary to maintain the temperature.

Assuming the temperature of the outside air is 0°, that of the influx 120° and that of the room as 70°, it is obvious that the air cools from 120° to 70° in overcoming the cooling surfaces, and that, as the efflux is 70°, there must be 70° wasted through the vents; hence the loss due to cooling surfaces = 50/120 of the heat required.

As 1 cubic foot of air will give off 50/58 B. T. U. in cooling from 120° to 70°, the number of cubic feet required can be found by dividing the heat lost through the cooling surfaces by 50/58. This may be better understood from the following formula:

Cubic feet of air required $= \dfrac{\left(g + \frac{w}{4}\right) t\text{–}t^{\circ}}{50/58}$ by substituting the usual values for t and t° the air required $= \dfrac{\left(g + \frac{w}{4}\right) 70\text{–}0}{50/58}$ or the air required $= \left(g \frac{w}{4}\right) 81$.

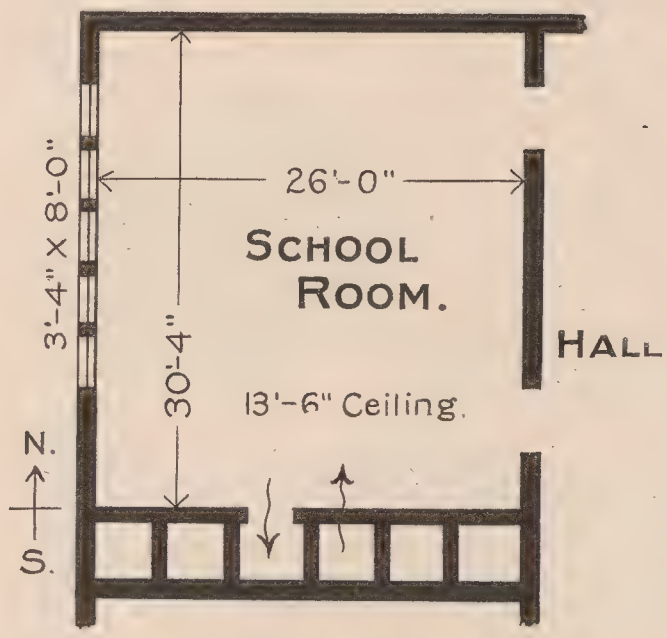


Fig. 2.

Example No. 2: Find the amount of air necessary to maintain the temperature of the schoolroom shown in Fig. 2:

West exposure = 30′ 4″ × 13′ 6″ = 410
West glass area = 5 × 3′ — 4″ × 8′ = 133

4) 277 net wall.

69 equivalent glass.
133 glass area.

202
Add 5% for west exposure 10

212 total glass to west.

North exposure = 26′ — 0″ × 13′ — 6″ = 351
4) 351

88 equivalent glass.
Add 10% for north exposure 9

97 total glass north.

(97 + 212) × 81 = 25029 cubic feet of air required per hour to maintain the temperature. This is equal to about 2.5 changes

per hour; hence, if ventilation is a desideratum, it will be necessary to increase this amount.

Being a schoolroom, the ventilation should at least be equal to eight changes per hour, which would give 85,280 cubic feet per hour.

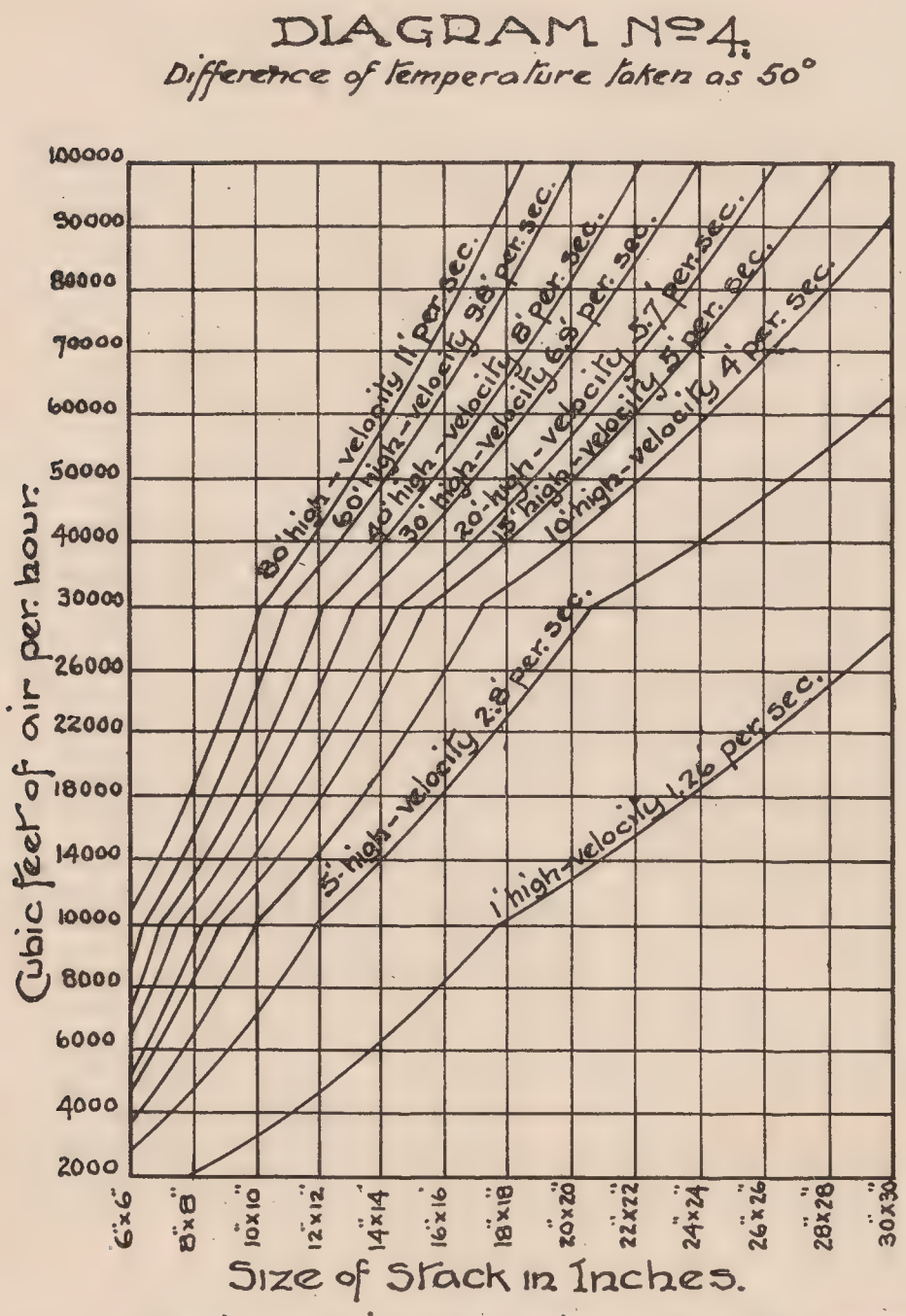
STACKS.

To find the size of stack required, it is necessary to know the height, for upon this depends the velocity. The room shown is on the second floor, and the plans give the height from the top of the coil to the bottom of the outlet as 30′ 0″. By referring to Diagram No. 4 it will be seen that a stack 30′ 0″ high, which will deliver 85,000 cubic feet, must be 22″ by 22″ in plan.

(NOTE.—It is a wise precaution to proportion the stack so that the velocity shall not exceed 6′ per second in a gravity system.)

VENTS.

Vents are generally made smaller than the heat stacks, because the air is reduced in volume when cooled, but this would seem a doubtful practice, as the motive force of the vent in mild weather is much less than that of the heat. As the reduction in volume of air cooled from 120° to 70° is about nine per cent, it is obvious that the vent should be at least 9-10 as large as the heat and may be made equal in size with advantage.



The intersection of the diagonal and the horizontal corresponding to the height of stack and the air required, respectively, locates the vertical giving the size of stack necessary.

INDIRECT STACKS.

To heat 85,000 cubic feet of air from 0° to 120° would require:

$$\frac{85000 \times 120}{55} = 185454 \text{ B. T. U.}$$

With indirect radiation the heat given off is practically all convected and the emission varies not only with the difference in temperature but also with the velocity of the air passing over it.

Indirect radiators are generally arranged as shown in Fig 3, and the air, entering at the bottom, is heated as it passes through the successive tiers. Suppose the entering air to be 0° and the radiator 212°; as the air passes the lower tier it is heated to 50°, as it passes the next tier it is heated to 90° and on leaving the top tier it is 120°. The bottom tier has heated it 50°, while the top tier has heated it only 30°, because the difference in temperature has been decreased as the air was heated. It is obvious, then, that the emission is proportional to the average difference in temperature, hence in the example given the average difference would be $212° - \frac{120° + 0°}{2} = 152°$. Knowing the velocity of a 30′ 0″ stack to be 6.9 feet per second and the difference in temperature to be 152, the rate of emission per square foot is found in Diagram No. 3 to be 775 B. T. U. per hour, hence

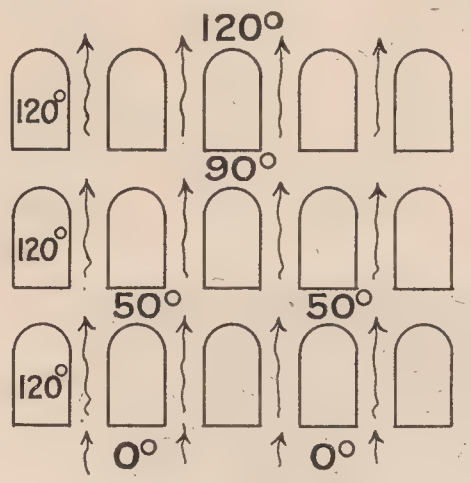


Fig. 3.

$$\frac{185454}{775} = 240 \text{ square feet required.}$$

Had the room been in the first story, the height of stack would have been 10′ 0″, which would give 29″ by 29″ as the stack section and 309 square feet as the radiation required.

A QUARTET OF MURAL PAINTINGS.

MR. OLIVER DENNETT GROVER, in selecting motives for his mural paintings for the Blackstone Library, chose Art, Literature, Science and Labor, and treated them in a uniform manner, and following the prescribed architectural limitations he arranged his groups so that each had a central figure symbolic of the general subject. In "Art" the background

CHEMISTRY.

is blue; in "Literature," red; in "Science," gold, and in "Labor," green. In discussing his work in *Brush and Pencil,* Mr. Grover says:

"I can see no reason why the mural painter should be hampered by the common idea of the unities, so called, if his theme

or motive is symbolic in character. If the mural painting is to be the depiction of a historical scene, the verities of time, place, costumes, everything should be observed. But in a purely decorative symbolic picture I can see no reason why an artist should not allow himself every latitude conducive to the decorative effect he wishes to produce.

"There is, as a matter of fact, no break in the chain of development in any branch of human interest, and this truth alone is sufficient warrant for the artist to take such license as he sees fit in the selection of the symbols to typify his ideas. There is

MANUFACTURE.

no reason, for instance, why History should not be represented by an old man of patriarchal aspect, with a huge tome of former days, and Fiction by a girl of present-day type scattering the poesies of human thought. The scythe and the pick are practically as old as the hills, and the locomotive is a distinctively latter-day invention. But I can see no reason why, in a composition typifying Labor, the world's industries, the symbols of diverse climes and many ages, should not be employed. The crude retort of the old-time alchemist is just as legitimate a symbol of the science of chemistry as the paraphernalia of the modern laboratory. And so with all the rest. The symbolic painting is crippled, in my opinion, when the artist hedges himself around with strictly conventional or arbitrary limitations.

"In all conscience, the difficulties attending mural painting are numerous and great enough. The prime end to be attained is to produce something in harmony with the other appointments of the room, something decorative, something serious and dignified and yet pleasing. You may turn your back on the easel picture if you choose, you can not escape the mural painting. Hence the pleasure of the greatest number must be a consideration with the artist. The mural painter who indulges in experiments likely to pall on the cultured many, or takes occasion to exploit personal predilections without a studious regard for the feelings of those for whom the work is produced, is disloyal to his trust. Harmony, grace, beauty — something rich in ideas that will yet appeal to the public as a decoration — should be the mural painter's aim."

RUSSEL STURGIS, the architect, speaking at the Architectural League's semi-monthly dinner in New York recently, referring to remarks made by Francis W. Halsey, said: "What do we artists care about Anglo-Saxon rule? Doesn't Mr. Halsey know that we would have been ten thousand times better off if French civilization had become ascendant here? We got one thing and lost another. We got trial by jury and lost all sense of art and literature." Mr. Sturgis referred to the Washington monument as "that infernal old shaft on the Potomac river," and said that if a fire would come and burn it down, and if it could be replaced by the right sort of memorial, then the city of Washington would have a *raison d'etre.*

THE PENNSYLVANIA RAILROAD'S NEW YORK TERMINAL.

THE projected New York city terminal of the Pennsylvania Railroad Company has aroused great curiosity and interest among engineers and the general public, not only on account of the apparent magnitude of the undertaking and the far-reaching effects which such a much-needed improvement would undoubtedly have upon the traffic conditions in and about Manhattan, but also because of the broad-minded policy and evident good faith on the part of the Pennsylvania Railroad Company shown in their projected plans for the rendition of a vitally important public service.

The conception includes a double tunnel to Manhattan, with a four-tunnel extension to Long Island, and a double terminal plan involving both Manhattan and Long Island, together with the improvements which naturally follow upon the Long Island Railroad.

The double tunnel will extend from the west side of Bergen Hill, in New Jersey, to the New York Terminal at Thirty-second street, with terminal structures which will occupy the site bounded by Thirty-first and Thirty-third streets, Seventh and Ninth avenues, with Thirty-second street closed for sixteen hundred feet between these two avenues. Four tunnels will connect this terminal with the Long Island Terminal at Long Island city, where the railway terminal facilities proper will be located, with accompanying yards; and the power houses, aggregating upward of one hundred thousand horse-power, one on Long Island and the other in New Jersey, with methods of electric transmission for handling the entire service of the Pennsylvania and Long Island roads into these terminals from the point at which steam is detached.

From the information which has become gradually known in the development of this enterprise, it is now apparent that the management conceived of a method which is almost original in its simplicity. The management conceived of this work as composed of four main functions: the tunnels, the architecture, the mechanical and electrical engineering, and the bringing of the railroad into and through them.

A commission of engineers to design and supervise the construction of the tunnels was created, architects appointed for the structures, and engineers for the mechanical and electrical equipment; while the chief engineer's department brings the road into the property thus created.

The commission whose mission is to design and produce the tunnels consists of Col. Chas. W. Raymond, United States Army, engineer New York harbor, chairman; Charles N. Jacobs, C. E., chief engineer North River Section; Alfred Noble, C. E., chief engineer East River Section; William N. Brown, chief engineer Pennsylvania Railroad, in charge of tracks and terminal yards; Gustav Lindenthal, C. E., bridge commissioner of New York city; George Gibbs, M. E., first vice-president of Westinghouse, Church, Kerr & Co., in charge of mechanical engineering, electric locomotives and traction. It will thus be noted that the work is again departmented within the members of this commission.

The architectural work has been delegated to Messrs. McKim, Mead and White, whose large previous undertakings have perfected the necessary organization for this extensive work, and insure an artistic conception which will be in keeping with the city structures of which this terminal will be a conspicuous central feature.

Westinghouse, Church, Kerr & Co. have been appointed the mechanical and electrical engineers and constructors of the extensive and varied work which follows through many departments of the undertaking — their organization, already developed on other large work, automatically, so to speak, departments this work along the regular lines in which their engineering and construction operations are regularly conducted.

Following upon this appointment, the architects then made Westinghouse, Church, Kerr & Co. their engineers for this work, giving a peculiar roundness and self-contained relationship between these divisions analogous to the relationship between the engineers and the commission through the membership of the Engineers' first vice-president on the commission.

Paralleling this arrangement, Westinghouse, Church, Kerr & Co. have been appointed in a similar capacity by the Long Island Railroad in the electrification of its Atlantic avenue line, which will be served with power from the Long Island powerhouse, erected in the joint interest of the properties represented.

It will be apparent that the task of administration on the part of the Pennsylvania Railroad Company is largely simplified in having but three bodies with which to deal — the commission, the architects and the engineers — upon whom is placed the entire responsibility and labor of the execution of the work. The responsibilities, though large, are well guarded by the sufficiency of the organizations which have, by past experience, been perfected for just such undertakings.

The commission conducts its deliberations by meetings at regular intervals, following upon the departmental work of its individual members, which meetings are attended by Mr. Mead, the representative of the architects, while Westinghouse, Church, Kerr & Co., the mechanical and electrical engineers, are represented on the commission by their first vice-president.

Thus far, the active engineering work has consisted chiefly of investigations and determinations concerning methods, quantities and feasibility of numerous plans — the commission, the archi-

tects, and the engineers working independently upon their segregated duties and together matching and adjusting the various proposed features to the possibilities and limitations of the others. Thus there is being perfected by a process of study, design and approximation a final set of plans which will come before the management of the Pennsylvania Railroad for final approval, and upon which the work of construction will then actively proceed.

The engineers have already substantially completed the plans for the Long Island powerhouse, so that the work can be begun immediately upon the same; this has become necessary in order to provide electric power for the Atlantic Avenue Division of the Long Island Railroad, which will be completed for operation in advance of the tunnel construction. This power house, together with the one in New Jersey, will jointly serve the entire traction system, and each will have the provision for relaying the other, and for serving the New York terminal singly and jointly.

It is believed by those best informed that this enterprise has been conceived by its originators, and their spirit adopted, by the coöperative interests selected in a manner superior to any other large engineering undertaking that has been projected, and notwithstanding the large amount which must be expended, the professional and constructive efforts are not divorced from a proper standard of economy and efficiency, to the end that time may prove that this undertaking is commercially warranted.

A NEW SYSTEM IN JAIL DESIGN.

THE county jail at Akron, Ohio, which is a radical departure from the general plan of prison buildings, is nearing completion. It is so arranged that while the inmates can not see one another, they are plainly visible to the turnkey at all times. This allows for a separation of the prisoners, which prevents any intercourse between them. It has also been the aim in this building to produce an agreeable and attractive exterior, to disguise, as much as possible, the purpose of the structure. The interior is designed with special attention to making it sanitary and fireproof, and besides its commendable features as a prison has an extensive ventilating and heating system. The building is in two parts, with separate entrances; the front part constitutes the sheriff's quarters and consists of two stories, a basement and attic; the rear, or prison, section is trapezoidal in plan and encloses a triangular court open to the sky. The prison contains four stories, including the basement, of which all but the upper floors are for men. The basement of the residence half is utilized for the ventilating and heating plant for the entire building, and a part of the second floor over the sheriff's office is fitted up as the prison hospital ward, with adjoining attendants' rooms and complete toilet conveniences.

Each cell has a window into the court, but is inaccessible from any outside rescue, as the court can only be reached through the jail corridors. The windows are arranged in a series of receding bays and staggered in such a manner as to prevent the prisoners seeing one another, but to enable them to see and hear any one addressing them from the speakers' gallery. This makes it unnecessary to assemble them in one room where they would be liable to communicate with one another. The cell windows are to be heavily grated from the inside on a plane with the inner steel lining of the cells, while the sashes are on the court side of the wall, wholly inaccessible to the prisoners; they will have patent locks which are manipulated by the keeper from the balcony extending around the inner court. The floors of these balconies will be of glass so as not to cut off the light to the cells beneath.

An electric transmitter will be placed just outside each cell window, connected with a sensitive megaphone receiver in the jailer's office, which will report any communication of prisoners through their cell windows, or any unusual noises, such as sawing, filing or other indications of attempts at escape. A similar device will be placed in the padded insane cells to detail all the ravings or relapses of the inmates to the office.

A shower bath and laundry tray for the prisoners to do their own washing, will be located at the forward end of each exercise corridor, with hot and cold water mixing chambers and measuring tanks in the outer corridor, so that the keepers may control and limit the use of water. Instead of the usual iron cots, hammocks of heavy duck, bound with leather, will be used in the jail, for economical as well as sanitary reasons, as they can be readily fumigated or burned if unfit for further use, and may be cheaply replaced. The top floor is divided into two parts, one half being for boys and the other for women.

The ventilating and heating of the entire building, including the jail and sheriff's residence, is done by a combined forced and induced hot-air system. The circulation is established by a large motor-driven blower of the Buffalo Forge Company's make, which takes its air through an inlet fourteen square feet in area and containing a steam coil for slightly tempering the air in the severest weather. The blower discharges partly through a heater and partly through a by-pass into a plenum chamber.

The blower is a 90-inch fan with a 64 by 32-inch wheel and runs at 225 revolutions per minute. At this speed its capacity is thirteen thousand cubic feet per minute. The fan is belted to a 5-horse-power motor, built by the Akron Electrical Manufacturing Company.

Mr. F. O. Weary, F. A. I. A., of Akron, is the architect of the building, and the patentee of the type of the prison described. The ventilating and heating apparatus was designed and supplied by the Buffalo Forge Company, of Buffalo, New York, and the complete equipment was installed by Kraus, Kirn & Company, of Akron.

CHICAGO ARCHITECTS' BUSINESS ASSOCIATION.

THE annual banquet of the Chicago Architects' Business Association was held on March 13, attended by about one hundred architects of the city. The trend of thought and the variety of interest represented by the association was indicated by the subjects chosen by the several speakers.

Normand S. Patton addressed the assembly on the general aims and purposes of the association in which, by an analogous story, he showed that the work of the association, during its six years of existence, had been definite and productive of practical benefit to the public and the profession at large. Mr. W. W. Clay responded to the toast, "The Illinois Chapter of the American Institute of Architects." Judge C. G. Neely made apt comparison between the arbitrative province of the architect and that of the judge, and in a manner indicating an intimate knowledge of the architect's work, showed the analogous position occupied for each and the opportunities for benefiting the public for whom they acted. State Senator Neils Juul, who has in charge the bill changing the present lien law, recommended that every interest be centered upon the form of bill proposed before it is presented to the Legislature for passage, and that the acceptance and the unanimous support of the twenty-eight organizations in the building trades, affected by its provisions, be obtained. Mr. Juul gave some very practical and valuable advice upon the proper way to obtain legislation in general, which was heartily received.

Professor N. Clifford Ricker, of the University of Illinois, gave an interesting historical sketch of the growth of that school, particularly its architectural and engineering departments.

A. Lundquist, whose work in the direction of obtaining a proper and beneficial apprenticeship system for American boys has been constant and faithful, and who has accomplished more than any other individual or association, with perhaps the exception of George Watson and the Mechanics' Institute of Philadelphia, gave a description of the work and what had been accomplished in Chicago, and the work the architects of the city had done in its advancement.

Mr. Franklin MacVeagh addressed the assembly upon civic improvements in a speech that showed how thoroughly he had studied the subject and how enthusiastic he and the progressive citizens, of which he is a representative, were in the sanitary and physical improvement of the people's surroundings.

The work of the Chicago Architects' Business Association, as indicated by its name, is definite and practical and has become a strong factor in the building affairs of Chicago and the State. Its success has been largely through the faithful work of a few energetic members, who have gradually drawn around them not only the architects of the city but have interested many in the various professions who are interested in the advancement of the city.

COMBUSTION.*

BY MORRIS R. EBERSOLE.

(Continued from Page 9, Vol. XLI., No. 1.)

IT IS possible, in what is called a Bunsen burner, to so delicately regulate the supply of air (or oxygen) that common illuminating gas may be burned with a perfectly non-luminous, consequently very hot, flame. This is an example of what may be called perfect combustion; a cold object held in the flame of such an adjusted burner will not be covered with a deposit of soot, because the carbon is so completely burned up forming an invisible gas, carbon dioxide. If the regulator of this burner is shut off, an illuminating flame will result, which will deposit soot, or a dense smoke will be produced from the flame; here we have an example of imperfect combustion; the heat effect is not so large, because the combustion is not complete, and a great waste of the unburned products results. Just so in the combustion of ordinary fuels — coal can be made to burn most completely with the proper supply of air, the resulting gases rising, mixing, and expanding, giving the most favorable conditions for a completion of the chemical reaction of perfect combustion; the result will be the most heat evolved for the given amount of fuel taken and the conditions surrounding its combustion. If, however, the air supply is meager, and the resulting gases are not given the best opportunity to mix and expand, the coal will burn, but the object of its burning, the heat obtainable from it, will not be near so great as in the former case, the unburned gases will not have completed the chemical reaction of burning, and as a consequence, there will be a great waste of valuable products, not only of the heat it would otherwise be possible to obtain but in actual unburned fuel in the form of carbon and unburned gases.

There are three stages in the chemical action of combustion or burning fuel: First, the oxygen of the air impinging upon and penetrating the bed of coals at the bottom of the grate forms with the carbon, carbon dioxide, an invisible non-poisonous, but suffocating gas; second, the carbon dioxide coursing up through

* From *The Boiler Magazine*, Kellogg-Mackay-Cameron Company, Chicago. See ad. in this journal.

the burning material and coming in contact with red-hot carbon, recombines with it to form carbon mon-oxide, an invisible, poisonous gas, capable of uniting with more oxygen, and as this gas, now heated to incandescence, comes in contact with the oxygen of the air at the top of the burning fuel, it again burns, uniting with the oxygen to form carbon dioxide again. The thin bluish flames playing around the top of a bed of hard coal or coke are usually the evidence of this last reaction.

The red-hot gases rising from the burning fuel are at a very high temperature; they expand, and mix to complete their burning, using up as much oxygen as they are capable of. This condition produces the highest heat effect, and at this point, where their simultaneous operations are taking place, we may expect to obtain the greatest heat.

After all, it is a simple problem — a given quantity of fuel, a given quantity of air or oxygen to burn it perfectly, and provision above the burning fuel for the necessary expansion of the resulting gases of combustion.

SOUTH FIELD DESIGNS OF COLUMBIA UNIVERSITY.

An interesting study of the "South field" by the architectural department of Columbia University, at New York city, has just been completed. The fifteen designs, representing the result of three years' study by the fourth year architectural class under the guidance of H. F. Hombostel, lecturer on architectural design, are now on exhibition.

The program of the problem was prepared by Professor Hamlin and contemplates the purchase of not only the south field, but of four or five additional lots on the side of One Hundred and Fourteenth street, as a site for a president's house and an axis for the library. A great variety of form is shown in the designs and, while only expressing a problem of what might be done, no better use for money could be found than in giving to New York's greatest educational institution such a setting as these plans outline.

THE RELATION OF NATURAL TO ARTIFICIAL BEAUTY IN LANDSCAPE.*

BY WALTER COPE.

AT this age we are in the midst of great structural and engineering undertakings to meet the practical needs of our present civilization; with little thought as to their artistic expression. But times will change and the practical developments of applied science will some day give way to more definite efforts to make the face of the earth more beautiful. It may be a question only of a generation or two when the imagination of the multitude may cease to be moved, as it undoubtedly is to-day, by the great developments in transportation, the building of huge buildings and swift steamships, and by the constant improvements in electrical propulsion and communication. And when we shall have solved all these questions of applied science and are content with our achievements in that direction, we may turn our efforts to still greater achievements in an artistic way. To-day those in whom the artistic sense is dominant are in the minority and this has always been so and probably always will be. But to-day differs from past ages in this fact, that the great majority of people in this age do not really care for artistic expression, do not care as much for the beautiful as they do for what we commonly call "the practical." To-day the artist occupies a relation to the great mass of humanity almost analogous to that which the mediæval alchemist or scientist held in the day when it was the artist who counted, and who captured the applause of the multitude. It is true that the support of the multitude is constantly increasing, but as yet this support has not swept everything before it, and a utilitarian and purely practical tendency is still dominant. The artist of to-day is not in need of better criticism. He has as good criticism as any age has produced, but he is in need of a greater amount of criticism and of the backing of the majority of the people, the criticism of the masses which finally, if not immediately, condemns the inartistic and upholds that which is sound and true in art.

Whatever scene our eyes may light upon, whatever landscape we may contemplate, there can be only two factors — two agencies — which determine its effect upon our minds, upon our sense of the beautiful — Nature and Man. Nature, of course, is a very wide term, but we know what we mean. It is the supreme, the eternal, ever-present factor. We can not escape from it entirely if we would, for even man in his works is governed by Nature's own laws. No one of them can he undo or abrogate. The primary laws of physics must govern everything which he builds, and the artistic expression of his building must reflect an acknowledgment of natural laws. But in distinguishing between these two agents, I mean to refer to Nature as that which she does without the aid of man; what she would have done had man never lived upon the face of the earth. On the other hand, in many scenes and many things which we love to look upon there is predominant the other agency, and our delight in its contemplation at times transcends even that which we feel in looking upon Nature; the thought that this stone has been hewn and set, this building has been reared, this path has been cut, these trees have been planted by *man* and to satisfy man's needs and ideals. Perhaps no two of us could agree upon the intensity of pleasure derived from the contemplation of a great cathedral, on the one hand, or the majesty of a rock-ribbed mountain, or the boundless sea, upon the other, nor is it worth while that we should agree. To some of us Nature appeals more than art, though I believe that to most of us each appeals with almost equal force, according to our varying moods.

It follows then that if we are to arrive at the true sources of artistic enjoyment we must cultivate and love and study first of all *Nature* and after that man's history, man's ideals, all, in fact, that has led him to express his wants, his aspirations in physical form. This last is nothing more nor less than the study of architecture in its broadest sense. For all that man builds with an eye to use and beauty is architecture in the sense that it is governed by one system of principles and laws. From time immemorial man has built houses and temples and bridges, has hewn roads and laid out gardens and wrought whatever pleased him upon the face of the earth to satisfy his needs, material and spiritual. And from time immemorial it has pleased him and it pleases us to-day and will always please our descendants, to follow certain methods, certain principles of dimension, direction and proportion in that which we lay out and build. These methods are no doubt deduced primarily from our innate sense of natural laws. But it is scarcely necessary to go into the source of them. Suffice it to say that it is an indisputable truth that man prefers to set stones level, to build walls straight, or, at least, symmetrically curving, to make level places on which to stand or walk, whether they be floors beneath a roof or terraces under the open sky. His sense of mastery over Nature is expressed in doing things not as Nature would do them. Nature upheaves and splits and tumbles down her rocks. Man hews them into blocks and sets them level and true and rears them into walls. So it always has been — so it ever will be.

In every landscape, then, these two elements must remain distinct. We can not absolutely unite them nor deceive ourselves into thinking that we can. We can not modify to any extent worthy of consideration the process of natural growth, or at least such modification can be but temporary. Nature is absolutely continuous and persistent. We must then regard ourselves only as intruders — invaders. It is true that we can interfere with Nature, but it is my purpose to point out that it is not as interferers that we should regard ourselves. As invaders we may, for we could not avoid the position if we would, unless indeed we return to absolute savagery.

About the middle of the century just passed, there grew up a school of landscape gardening, so-called, which was perhaps a natural reaction against the extreme and lifeless formalism into which architecture had descended. This school made a complete revolution in the principles which had always before that time governed all artificial interference with the face of nature. It did not propose to do merely what man had always been pleased to do in the way of laying out and building and planting, but instead proposed rather to imitate and follow Nature on the lines which she has always reserved to herself. This school still has its disciples, and the results of its work are all about us and have caused, to my mind, a most deplorable subversion of the laws and the principles upon which beauty in landscape must depend. Nature is entirely able to do without the aid of man, and it is equally true that it is impossible for man to imitate Nature without making himself and his work more or less ridiculous. When he attempts it, he must cast to the winds all the methods, all the principles which he has developed in centuries past, and he must play at his game as a child would play at horse. But every once in a while he has to leave his play to attend to the serious matters of life, to build a house or a flight of steps, and these he has to do on the same good old lines that have always prevailed in architecture. He may build his silly little rockeries in would-be imitation of Nature and cut his meaningless winding walks, but he can not cease to build civilized buildings, he can not be content to live in caves or rude, shapeless huts.

The moral of all this is, let Nature alone, except where, to satisfy your own practical needs, to satisfy your own ideals of the beautiful, you invade her sacred domain with works that are frankly and freely designed upon lines not imitative or in competition with her, but rather on lines which have commended themselves to man as necessary, reasonable and beautiful from his own particular point of view, lines which embody all which he has ever developed as an expression of his own mastery over the earth.

Can we then intrude upon Nature in anywise without destroying its charm? Decidedly we can. We may invade Nature with our works and find the result all the more charming and, in the same manner, Nature may, and does, invade our works only to increase their charm. But the cypresses, growing without restraint, long after the builders of those stately balustrades and fountains are forgotten!

Nature, in her own wildness and ruggedness and majesty, we can not rival, and she, on her side, makes no attempt to rival us. The majesty and beauty of the lonely mountain side we can not create, but we may invade it without destroying its charm. Nay, more, we may introduce the human element in a way only to heighten and increase that charm, and it is just where those two elements meet, each in its purity, its frankness, its directness, that we often find the very highest and keenest sense of the

*From a paper printed in the Thirteenth Annual Report of the Fairmount Park Art Association.

beautiful. Can anything be compared in beauty with the views from out the terraced gardens of the Italian lakes, across the deep, smooth surface of the water to the great mass of the Alps beyond? Is a flower ever more beautiful than where it has grown in the crevices of a mouldering ruin? And which is most desolate — the city street, devoid of one touch of natural growth, whether of leaf or flower, or the unbroken expanse of a trackless plain? We have our moods when each of these may please us and Nature has every advantage both in majesty and beauty, but it remains that man is a social being, and, as a rule, he loves to be reminded of the existence of his fellow-man both past and present. He will never resent the evidences of that existence if they occupy a reasonable and proper place.

PAINTS IN ARCHITECTURE.

A SUGGESTIVE REPORT.

THE House Painters and Decorators of the United States recently held their annual convention at Richmond, Virginia. Among the reports submitted was one from a committee appointed more than two years ago to make a practical test of the various brands of white lead on the market. By some chance, intentional or inadvertent, several brands of combination paints and one make of pure zinc white were included by the committee in the materials tested.

At this meeting the committee reported upon the condition of the boards after two years' exposure. The report is most interesting and instructive, but it is especially significant from the way in which it seemed to demolish certain painters' theories.

The first is that the older the linseed oil the better results will it yield when used in paint. Five of the sample boards were painted with materials in which the oil for thinning was "old process" oil twenty-five years old. The state of the samples was uniformly bad.

The second demonstration, contrary to general expectations, was the integrity of the pure zinc coating. Painters generally contend that zinc white on exterior work will crack; but in this case the zinc painted board (No. 20 on the list) is reported as "light in color, hard surface and immovable" (by the finger under water). Altogether the zinc test showed up best of all.

It is a very interesting report and will repay careful study.

CHARLES JOURDAIN.

MOSAICS.

IN the State of New York there are approximately 8,143 miles of railroad, with 10,037 highway crossings, of which 8,599 are at grade. Prior to May 22, 1897, the only crossings eliminated were those changed voluntarily by the railroad companies, or through mutual arrangements with the towns and municipalities. On the above date, however, the present grade crossing law went into effect, and according to this the maximum expenditure which can be made during a single year, with State aid, is $400,000, of which half is contributed by the railroads. But as matter of fact the appropriations from 1898 to 1901, inclusive, aggregated only $367,500, or a trifle over $90,000 per annum, and in 1902 no appropriation whatever was made. As a consequence of this disinclination on the part of the State to carry the work forward, very little has been done considering the need. Since the act became a law, about sixty-five of the 8,599 crossings have been eliminated, so that, at the present rate, about 132 years will be required to complete the work. A comparison with conditions in Massachusetts shows how unprogressive New York is in these matters. During the year ending June 30, 1902, 184 persons were killed and injured at grade crossings in New York State; equal to twenty-five per one million inhabitants. In Massachusetts, during the same year, thirty-seven persons were similarly killed or injured, which is at the rate of twelve per one million inhabitants; less than half the percentage for New York State. In a word, Massachusetts, with a population about one-third as great as New York, has, up to the present time, appropriated nearly thirty times as much money for the elimination of grade crossings, and, as a result, shows a ratio of accidents to persons which is less than one-half as great, with a prospect of greatly reducing the figure in the near future. A further result of this liberality has been the increase in the value of property adjacent to the railroad, with correspondingly greater assessment for taxation.

IN asking for competitive plans the South Park Commissioners of Chicago have announced the following general specifications for the design for South Bridge, Jackson Park: The bridge is to carry a forty foot macadam driveway and two walks, not less than ten feet in width each, over the entrance from the harbor to the south lagoon, and shall not cost to exceed $35,000. There shall be a clearance over the water in the center of the opening or openings of thirteen feet when the water is standing one foot above city datum. It is desirable to keep the grade of the driveway as low as may be consistent with a suitable design and the requirements as to clearance over the water. A substantial and durable bridge is desired, one which will require the minimum expenditure for maintenance, and of suitable strength to carry satisfactorily the greatest traffic which may come upon it. Whether of one or more arches or openings, there shall be not less than forty nor more than fifty-four feet of clear waterway altogether, and no one opening shall be less than eighteen feet wide at the water line. All plans and elevations shall be drawn to a scale of four feet to the inch. A half-plan, cross section and elevation shall be shown. Every design submitted shall be accompanied by a general description of the character of the bridge proposed, indicating the materials to be used, and an estimate of the cost. Should any design be accepted by the South Park Commissioners, the maker will be employed to make detailed plans and specifications for the bridge, and will be paid therefor two and one-half per cent of the cost of the bridge. The Park Commissioners reserve the right to reject any or all designs. The designs must be submitted not later than 2 o'clock P.M., Wednesday, March 18, 1903, at the office of the Commissioners, Fifty-seventh street and Cottage Grove avenue.

ASSOCIATION NOTES.

BROOKLYN CHAPTER A. I. A.

The Brooklyn Chapter of the American Institute of Architects held its annual dinner, March 1, at which the speakers were Frederick Crowninshield, president of the Fine Arts Federation of New York; the Rev. John White Chadwick, Commissioner of Public Works Redfield, Julius F. Harder and Walter Parfitt. The president of the Chapter, J. Monroe Hewlett, presided.

Mr. Crowninshield said that many people made a great mistake in classing art as something entirely outside of the pale of utility. Artists must not be looked upon as impractical people. They realize the importance of utility as much as the utilitarians. Because a thing is artistic it does not follow that it is worthless.

"If artists were called upon to solve any such practical questions as the laying out of a city, for instance," said Mr. Crowninshield, "it is quite probable that they would not only lay out a very beautiful one, but a very convenient and useful one also."

The speaker said that the present congestion from which Manhattan is suffering is because of the utilitarianism which caused lofty buildings, often as high as twenty stories, to be erected on avenues of travel, which were originally intended to accommodate only eight-story buildings. The note of warning had been sounded by architects, but not heeded, he said.

Julius Harder said he wanted to know why professional bodies like the architects' organization could not come closer in touch with municipal government, and have more influence in the municipal work, such as described by Mr. Redfield. Such questions, he said, as the tenement house question very largely concerned the architects, and it was a little lamentable, in view of all the bills introduced at Albany dealing with this matter, that the influence of a professional man is lacking in every single measure. A great many of the questions that arise are not political questions, but merely have to do with municipal housekeeping. The speaker said that he was glad the influence of professional men had prevailed in the laying out of the streets in Manhattan. The gridiron plan, he said, has been proved to be all right for an island like Manhattan. Two and one-half cross streets to one longitudinal one was a wise idea. The men who laid out the streets there knew that there would be more than twice as many people going crosswise than would travel lengthwise on the island. For that reason, he said, the building of the lengthwise subway before the tunnels to Jersey and Brooklyn were built was a mistake. If there had been professional influence in the Rapid Transit Commission he believed the crosswise tunnels would have been built first. These questions are for men in the architectural ranks to solve, even more so than in the engineering ranks.

OUR ILLUSTRATIONS.

Residence at Los Angeles, California.

Residence at St. Louis, Missouri; Barnett, Haynes & Barnett, architects.

Chicago Normal School; W. B. Mundie, architect, Board of Education.

Clinton Free Library, Clinton, Iowa; Patton & Miller, architects, Chicago.

High School Building, Connersville, Indiana; Patton & Miller, architects, Chicago.

Studies for Mural Paintings for the Blackstone Library, Chicago; made by Oliver Dennett Grover. Courtesy of *Brush and Pencil.*

Wendell Phillips High School, Thirty-ninth street, Prairie and Forest avenues, Chicago; W. B. Mundie, architect, Board of Education.

Restoration of the White House, Washington, D. C. The terrace; state dining-room and mantel detail in same; mantel in east room.

Photogravure Plate: Hyde Park Exchange, Chicago Telephone Company; C. G. Hellick, architect.

PHOTOGRAVURE PLATES.

Issued only with the Photogravure Edition.

Residence, New York.

Residence, Wynwood, Pennsylvania.

Public School, Brighton, Massachusetts.

Apartment House, New York; Israels & Harder, architects.

Euclid Hall Apartment Building, New York; Hill & Turner, architects.

Dormitory Building, University of Chicago; Dwight H. Perkins, architect.

Manhattan Congregational Church, New York; C. W. and A. A. Stoughton, architects.

THE INLAND ARCHITECT AND NEWS RECORD

Vol. XLI. ADVERTISERS' TRADE SUPPLEMENT. No. 2

A HANDSOME CALENDAR.

We are in receipt of an exceptionally handsome wall calendar from the Winkle Terra Cotta Company, of St. Louis, Missouri. The picture which gives it distinction is a fine reproduction of H. Siemiradski's painting, entitled, "In the Time of Nero," representing a scene in the Roman amphitheater, in which a Christian maiden has just come to her death. The sense of action is very manifest in every figure, and the varied expressions of the numerous actors are most clearly depicted. It will prove an attractive calendar for any office, and therefore an excellent advertisement for this well-known and reliable company. Terra-cotta is becoming more and more used in architectural construction and decoration, as its value is better understood, and this old-established company furnishes it in all colors and in every conceivable variety.

AN OLD-TIME FIRM.

A neat desk calendar, conveniently arranged for recording important engagements, has been received from Samuel H. French & Co., of Philadelphia. This well-known firm, established in 1844, are still keeping strictly up to date in their various manufactured specialties, being most favorably known to architects and builders for the high grade of their paint, white lead, varnishes and japans. Handling also the Dexter Portland Cement, which is of the highest attainable standard, and with a special branch devoted to original designs in tiles, mantels and grates, there are few practical constructors in the country with whom they fail to do business. Their goods are always of the highest standard of excellence, and the natural result has been a constant increase in sales.

A WORD ABOUT CORDAGE.

The issuing of their annual catalogue for 1903 recalls to mind the proven value of the solid-braided cords manufactured by the Samson Cordage Works, 115 Congress street, Boston, Massachusetts. Long experience and careful tests have abundantly demonstrated their practical durability as compared with twisted, cable-laid or hollow-braided cords, or even metal chains and tapes.

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The building ordinances in several of our larger cities where high buildings are in vogue are now requiring metal frames and sash as a protection from fire. To meet these requirements, Voigtmann & Co., having offices in Chicago and New York, have placed upon the market an Adjustable Weather Guide Window which will prove of interest to architects everywhere, and especially to those in the cities where such ordinances are in force.

Its lines of construction are practically the ordinary box frames, with usual pulleys, sash chain and weights. The novel feature is the adjustable weather guide, which gives it a value all its own and will be appreciated at once upon sight. This window is now being furnished to several important buildings under construction, among which may be mentioned the fine twenty-story office structure to be known as the Battery Place building, in New York city.

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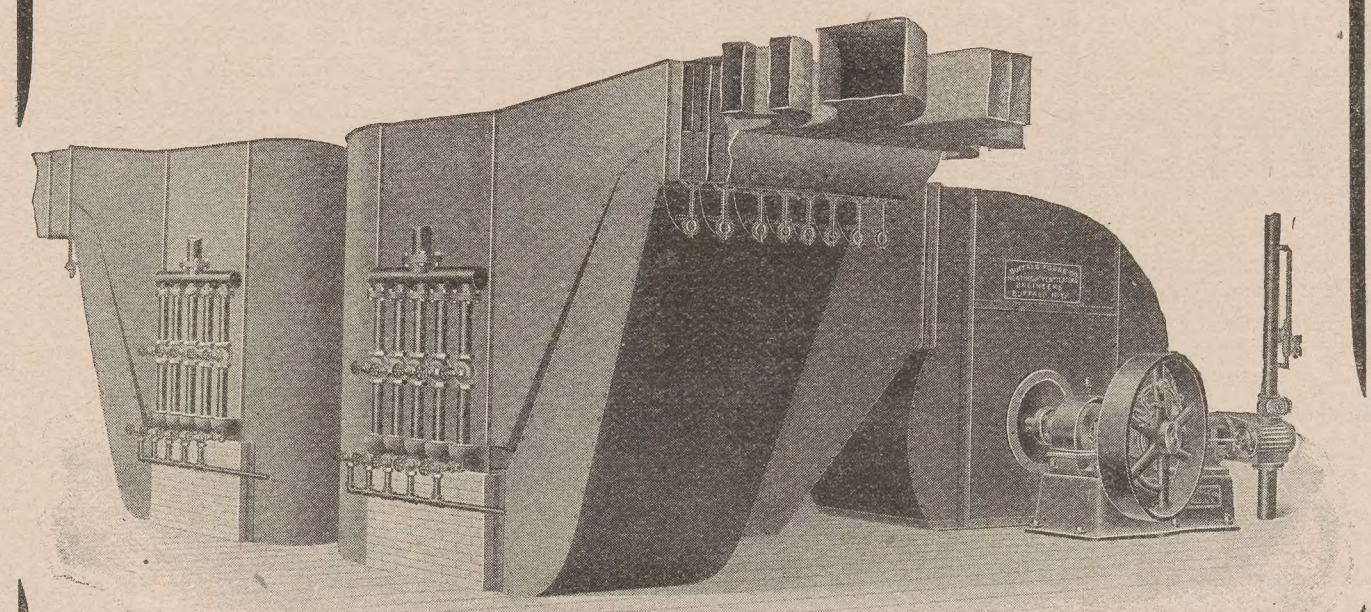

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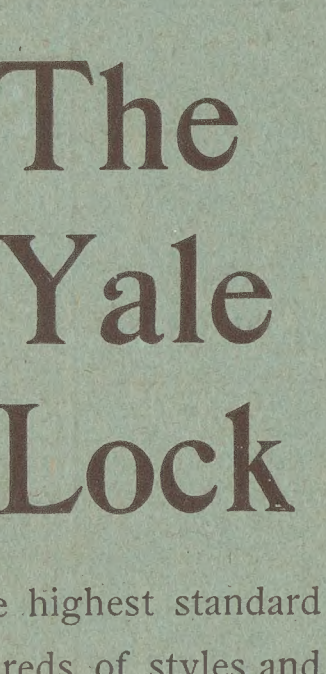

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